

# PATENT SPECIFICATION



Application Date: June 21, 1932. No. 17,509/32.

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## PROVISIONAL SPECIFICATION.

### Improvements in Aeroplane Wheels and Fairings.

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 32, Osnaburgh Street, London, N.W. 1, ERNEST FREDERICK GOODYEAR and JOSEPH WRIGHT, both British Subjects, of the aforesaid Company's Works, at Foleshill, Coventry, in the County of Warwick, do hereby declare the nature of this invention to be as follows:—

10 This invention concerns improvements in or relating to wheels and fairings for use on aeroplanes.

One of the objects of this invention is to provide a fairing which shall be readily attached to or demounted from its support and shall complete the streamline profile of a wheel fitted with a pneumatic tyre in the region where the tyre is seated upon the rim.

20 According to this invention we provide fairings for vehicle wheels, in particular the wheels of aeroplanes in which a contractile ring is extended and allowed to contract into interlocking engagement with a supporting surface, preferably independently of other securing means such as bolts or rivets and in which the undersurface of the rings are preferably seated upon and are complementary to a supporting surface having obliquely or radially disposed flanges, which may be formed axially and radially upon the outer periphery of a disc which covers the wheel centre, and in which a part of the resilient ring is interposed between the rim and the surface supporting the ring which may be formed wholly or partly of material such as sponge rubber, the supporting disc or ring being preferably secured to the hub of the wheel by means of a retaining ring provided with retaining screws or rivets.

In one embodiment of the invention, the wheel consists of a hub and brake-drum, which may be cast in one piece of light weight metal, the outer periphery or edge of the brakedrum being connected by a load supporting disc to one side of the rim, and on the opposite side by a load supporting disc extending from the rim to the hub.

The rim however, may be supported from the hub by compression or tension

spokes or by either of these in combination with discs.

On the inner side of the wheel, adjacent the vehicle is a trough shaped horizontally disposed ring secured to the brakedrums by means of set screws passing through brackets rivetted to the under surface of the ring.

The flanges of this trough shaped ring may be flanged radially or axially inward towards the rim and may also be flanged radially or axially outwards in spaced relation thereto.

On the opposite side is a non-load supporting disc, the periphery of which is axially flanged inwards and axially outwards to support a contractile ring, the disc portion of the fairing on this side extending from the rim to the wheel centre, where it may be secured to the hub by bolts, the heads of which engage an internal collar rivetted to the inner side of the disc, the stems of the bolts passing through the load supporting disc and threading into a flange on the hub.

Supported on the cylindrical surfaces thus formed, are substantially triangular rings of contractile material such as rubber, the internal profile of each ring being approximately semi-circular and of less curvature than that of the adjacent tyre wall.

One of these rings is provided on each side of the rim, the toe portion or apex of the triangle being rounded and bearing against the wall of the tyre, the outer side of each ring being substantially flat, as is also the base portion with the exception of one or more annular recesses or grooves which interlock with the radially extending toes or flanges on the metal part of the fairing. The inner side of each ring may be of concave formation and terminated in a flat toe portion, extended downwardly to bear against the upper part of the load supporting disc and of the rim itself, thus separating the tyre carrying rim from the rigid metal parts of the fairing with a yielding insulator.

The rings are preferably mounted to be of slightly smaller diameter than the disc so that when stretched on they are self securing on either side without other

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fastening being required, and thus may be quickly detached to permit of renewal or tyre inspection.

Dated the 17th day of June, 1932.  
W. BOND,  
Acting for the Applicants.

## COMPLETE SPECIFICATION.

### Improvements in Aeroplane Wheels and Fairings.

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 32, Osnaburgh Street, London, N.W. 1, ERNEST FREDERICK GOODYEAR & JOSEPH WRIGHT, both British Subjects, of the aforesaid Company's Works, at Foleshill, Coventry, in the County of Warwick, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention concerns improvements in or relating to wheels and fairings for use on aeroplanes.

The main object of the present invention is to provide a fairing to complete the streamline profile of a wheel between the rim and walls of the tyre, and which is positioned by its own resilience, weight being reduced to the minimum, not only by the employment of light weight material but also by obviating the securing means commonly employed hitherto.

The invention is also characterised by the improved facility with which the resilient portion of the fairing may be dismantled to permit of the removal or replacement of the tyre and with a corresponding facility in the ease with which the fairing may be re-assembled upon its support and in the improved degree of security attained in the manner in which the removable portion is clamped in position.

According to this invention we provide a fairing for aeroplane wheels in which a resilient annulus is detachably positioned between the rim and side wall of the tyre by the contraction of its inner periphery upon a flange projecting from a support independently of other securing means, preferably in which the annulus is formed with a recess in which the flange projecting from the support is seated, the support consisting of a centrally apertured disc, the periphery of which is flanged axially inwards and in which the edge of the support terminates in a radially extending toe, the inner diameter of the annulus being less than that of the support when removed therefrom.

In order that the invention may be more easily understood and readily carried into effect, the same will now be

described with reference to the accompanying drawing, in which the drawing shows a part sectional end elevation of the invention as applied to an aeroplane wheel.

The invention is shown applied to a wheel consisting of a hub 1 and brake-drum 2 which may be cast in one piece of light weight metal, the outer periphery or edge of the brake-drum being connected by a load supporting disc 3 to one side of the rim, and on the opposite side by a load supporting disc 4 which extends from the rim to the hub.

The rim however, may be supported from the hub by compression or tension spokes or by either of these in combination with discs.

On the inner side of the wheel adjacent the vehicle is a ring 5, the inner edge of which is radially flanged at 6, the ring being secured to the brake-drum by a number of set screws 7, passing through suitable brackets rivetted to the under surface of the ring.

On the opposite or outer side is a non-load supporting fairing disc 8, the periphery of which is flanged axially inwards at 9 and radially outwards at 10 to support one of a pair of interchangeable contractile rings 11.

The metal disc portion 8 of the fairing extends from the rim to the wheel centre, where it may be secured to the hub by bolts 12, the heads of which lie within recesses and engage an internal collar 13, rivetted to the inner side of the disc, the stems of the bolts passing through the load supporting disc and threading into a flange 14 on the hub.

The contractile rings, which are supported on the cylindrical surfaces formed on the outer peripheries of the ring 5 and disc 8, are substantially triangular rings of flexible, resilient material such as rubber, preferably sponge rubber, the internal profile 15 of each ring being approximately of arcuate profile and of less curvature than that of the adjacent tyre wall, so as to reduce chafing and unnecessary weight and to permit the rings the more readily to conform to the distortion of the tyre.

One of these rings is provided on each side of the rim, the outer surface of the

toe portion or apex 16 of each ring being rounded, the inner surface being concave at 19 to bear against the wall of the tyre 21.

5 The outer side 17 of each ring is substantially flat, as is also the base portion with the exception of an annular recess or groove which interlocks owing to the elasticity of the ring with the radially  
10 extending flanges 6 and 10 on the metal parts of the fairings. The inner side 18 of the lower portion of each ring is of concave formation complementary to the outer surfaces of the load supporting  
15 discs and is preferably terminated in an outwardly extending toe portion 22. The under side of which is extended downwardly to bear against the upper part of the load supporting disc.

20 The tyre carrying rim is thus separated from the more rigid metal parts of the fairings with an intervening portion 20 of yielding material, which not only eliminates any metal to metal contact  
25 noises between rim and fairing, but also forms a neck which is clamped between these parts, thus ensuring permanence of attachment.

30 The metallic portions of the fairings are positively supported in each case at their inner peripheries only so that although they are sufficiently rigid to clamp the contractile rings in position, there is some slight degree of yielding  
35 movement at their outer edges which facilitates the removal of the rubber portions positioned upon their peripheries.

40 The contractile rings are moulded of slightly smaller diameter than the disc so that when stretched on they are self locking upon the supports 5 and 9 on each side without other fastening being required, and thus the rings may be quickly interchanged or detached to permit  
45 of replacement or to permit of tyre inspection or replacement.

Having now particularly described and

ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:— 50

1. A fairing for aeroplane wheels in which a resilient annulus is detachably positioned between the rim and side wall of the tyre by the contraction of its inner  
55 periphery upon a flange projecting from a support independently of other securing means.

2. A fairing for aeroplane wheels according to Claim 1 in which the annulus is formed with a recess in which the flange projecting from the support is seated. 60

3. A fairing for aeroplane wheels according to either of the preceding Claims in which the support consists of a centrally apertured disc, the periphery of which is flanged axially inwards. 65

4. A fairing for aeroplane wheels according to any of the preceding Claims in which the edge of the support terminates in a radially extending toe. 70

5. A fairing for aeroplane wheels according to any of the preceding Claims in which the inner diameter of the annulus is less than that of the support when removed therefrom. 75

6. A fairing for aeroplane wheels according to any of the preceding Claims in which a portion of the resilient annulus extends between the rim of the wheel and the flange formed on the outer periphery of the support. 80

7. A fairing for aeroplane wheels according to Claims 1, 2, 5 and 6, in which the annulus is formed of sponge rubber. 85

8. Fairings for aeroplane wheels substantially as described with reference to the accompanying drawings. 90

Dated the 7th day of March, 1933.

W. BOND,

Acting for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

